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# Prevalence and risk factors associated with suicidal ideation among adolescents in Malaysia

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## Abstract

**Background:** Suicidal ideation, defined as thoughts, ideas and the desire to commit suicide, is becoming a major public health problem among adolescents. Indeed, suicidal ideation is known as a key predictor of future suicide risk.

**Objective:** This study aims to determine the prevalence and risk factors associated with suicidal ideation among adolescents in Malaysia.

**Methods:** This study used data from the 2013 Malaysian adolescent health risk behavior (MyAHRB) study, a cross-sectional school survey conducted in Peninsular Malaysia among school-going adolescents aged 16–17 years ( $n=2789$ ). Logistic regression analysis was used to determine the risk factors associated with suicidal ideation among Malaysian adolescents.

**Results:** The overall prevalence of suicidal ideation among the adolescents was 6.2%. The prevalence was significantly higher among females than males (7.6% vs. 4.7%;  $p=0.002$ ). Multivariate regression analysis revealed that adolescents who were females [odds ratio (OR)=2.02; 95% confidence interval (CI): 1.40–2.92] or of Indian ethnicity (OR=2.32; 95% CI: 1.35–3.98) were more likely to report suicidal ideation. Loneliness (OR=2.54; 95% CI: 1.57–4.11), anxiety or worry (OR=2.70; 95% CI: 1.70–4.31),

no close friends (OR=2.71; 95% CI: 1.43–5.14), and lack of supportive peers (OR=1.69; 95% CI: 1.15–2.47) were identified as risk factors for adolescents' suicidal ideation. Adolescents who ever had sexual intercourse (OR=2.70; 95% CI: 1.48–4.92) and had been in a physical fight (OR=2.45; 95% CI: 1.62–3.70) were also reported to have higher risks of suicidal ideation.

**Conclusion:** This study provides evidence on risk factors associated with suicidal ideation among Malaysian adolescents. Targeted mental health and health risk behavioral interventions for high-risk adolescents are recommended.

**Keywords:** adolescents; Malaysia; suicidal ideation; suicide.

## Introduction

Suicide among adolescents is a serious public health problem worldwide and is preventable. Globally, suicide is the most common cause of death among female adolescents aged 15–19 years (1). Suicidal behavior includes suicidal ideation (ideas/thoughts), plans, attempts and ultimately death, through a specific action (2). Although not all suicidal ideation materializes into suicide attempts or suicide, it is the first step on the pathway to suicide. Thus, it is considered to be one of the strong indicators of future suicide (3). Early adolescence is a period of significant change, during which children undergo the physical changes associated with puberty and face new challenges in their transition to the middle school where they encounter increased peer and academic pressures (4). Hence, thoughts about death and suicide become more common as children move through early adolescence.

In Malaysia, it has become an urgent concern as the suicide rates among adolescents are increasing. According to the Malaysian Psychiatric Association, seven people attempt suicide daily in Malaysia, with young adults making up the majority (5). The National Suicide Registry Malaysia (NSRM) reported that 16.2% of all suicide cases in the year 2009 were committed by those aged from 15 to

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24 years (6). The actual number of suicide deaths might be higher due to the nature of death recorded and under-reported suicide cases in the country (7). The reported suicide rate among Malaysian adolescents might have been under-estimated due to the social stigma attached to suicide, religious concerns and legal problems. Suicide is a very complex phenomenon and is a result of the interaction of the individual with a wide range of demographic, psychological, environmental, family and social factors (8). Unfortunately, very few studies have focused on the risk factors for adolescent suicide in Asian countries compared to the West, and adolescent suicide issues, in general, remain highly stigmatized in Malaysia.

According to the Youth Behavior Risk Factor Surveillance Survey (YBRFSS) conducted by the Ministry of Health Malaysia in 2010, the prevalence of suicidal ideation among Malaysian adolescents was 7.8% (9). The National Health and Morbidity Survey IV (NHMS IV) in 2011 (10) showed that 6.3% of the participants reported having suicidal ideation. In this survey, it was found that the youngest age group, 16–19 years old, was most disposed to suicidal thoughts followed by the 20–24 years age group. In addition, the Malaysia Global School-based Students Health Survey (GSHS) in 2012 reported that the prevalence of suicidal ideation among school-going adolescents was 7.9% (11). Although the prevalence of suicidal ideation has been reported in Malaysia, research focusing on risk factors associated with suicidal ideation among adolescents in the Malaysian context is scarce.

Identification of risk factors associated with suicidal ideation specific to Malaysian adolescents is necessary in designing school and community-based suicide and suicidal ideation prevention and intervention educational programs. Previous research in other countries has found that adolescents' suicidal ideation is associated with gender differences, depression, low parental care, sexual abuse, alcohol and drug abuse (12–14). In Malaysia, the GSHS data showed that the rate of suicidal ideation was higher among older adolescents aged 16–17 years than younger adolescents aged 13–15 years, particularly among female students (15).

In 2013, the Malaysian Adolescent Health Risk Behavior (MyAHRB) study was conducted throughout all the states in Peninsular Malaysia to obtain data on adolescent's health risk behaviors that contribute to the leading causes of death, disability, and social problems, specifically among Malaysian school-going adolescents aged 16–17 years. Because of limited studies focusing on various risk factors for adolescents' suicidal ideation in Malaysia, the present study aimed to determine the prevalence of suicidal ideation and to identify its associated risk

factors concerning a wide range of demographic, psychosocial, social-environmental and health risk behavioral factors among Malaysian school-going adolescents (aged 16–17 years), using data from the 2013 MyAHRB study. It was hoped that the findings from this study might provide further support to the existing literature on the topic and, perhaps, provide necessary information for planning possible future interventions.

## Materials and methods

### Study design and study sample

The MyAHRB study was a cross-sectional study conducted in 11 states involving 18 districts in Peninsular Malaysia from May to September 2013. Two proportionate to size sampling technique was utilized to obtain the sample of schools; the first stage was selection of districts with Clinical Training Centers (CTCs) for public health paramedics, followed by stratification of schools by locality into either urban or rural. Two secondary schools were randomly selected from each district with a CTC for public health paramedics. There were a total of 18 CTCs throughout all the states in Peninsular Malaysia. A total of 36 schools were chosen randomly using a simple random sampling method, 18 schools each for urban and rural areas. All students aged 16–17 years from the selected schools were recruited as participants. The exclusion criteria were those aged below 16 years and non-Malaysian citizens. The sample size needed for the study was determined using the prevalence rate of 3% (based on an estimated prevalence of suicidal ideation from the pretest), a design effect of three to allow for a clustering effect from each school, a precision of 1.5% and a non-response rate of 20%. Based on this sample size calculation, a total of 3578 respondents were needed for the study. However, only a total of 2991 respondents participated in this study leading to an overall response rate of 83.6%. Out of 2991 participants, 2789 responded to the question on suicidal ideation, giving a response rate of 93.2% to this question.

### Data collection

Parental or guardian consent was obtained from the students' parents or guardians approximately 7 days before data collection. The selected students were each given a consent form and a study information sheet to take home to their parents or guardians with instructions for it to be returned to the school teachers within a week. Non-returns were considered as giving consent. These were verified by the school administrators. Consenting students were then briefed before the questionnaire was administered. Students were assured of confidentiality, and data collected would only be used for research purposes by the Ministry of Health Malaysia. Teachers and other school staffs were barred from the venue during the survey session. Questionnaires were distributed and self-administered by the students, and further explanations were provided if the students faced difficulty in understanding any of the questionnaire items. The survey was approved by both the Ministry of Education and the Ministry

of Health Malaysia. Ethical approval was obtained from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (Approval code: NMRR-12-1210-12399).

## Instrument

A self-administered questionnaire in the Malaysian national language, Bahasa Malaysia, was used in the MyAHRB study. The questionnaires were pretested before they were used in the field. The structured questionnaire was developed based on the GSHS (16) and the Youth Risk Behavior Surveillance System (YRBSS) (17), and was further modified to suit the local socio-cultural context. The questionnaire consisted of information on demographic profile, mental health, protective factors and other health risk behaviors.

## Measures

Suicidal ideation was measured based on the question: “During the past 12 months, have you ever seriously considered attempting suicide?” The answer to this question was binary (yes=1; no=0).

Demographic variables were age, gender, ethnicity, parent’s marital status, household size and self-rated academic performance. Self-rated academic performance was assessed by asking students, “In general, how do you rate your academic performance?”. The choices provided were ‘Excellent’, ‘Good’, ‘Fair’, ‘Poor’ and ‘Very poor’. In the analysis, the response options were grouped into three categories: ‘Excellent/good’, ‘Fair’ and ‘Poor/very poor’.

For psychosocial factors, loneliness was assessed by the question: “During the past 12 months, how often have you felt lonely?” with response options ranging from 1=never to 5=always [recoded 1=most of the time or always (yes); 0=never to sometimes (no)]. Anxiety or worry was determined based on the question: “During the past 12 months, how often have you been so worried about something that you could not sleep at night?”. Response options were from 1=never to 5=always [recoded 1=most of the time or always (yes); 0=never to sometimes (no)].

For social-environmental factors, having close friends was measured with the question: “How many close friends do you have?” [recoded 1=one or more (yes); 0=no]. Peer support at school was assessed by the question: “During the past 30 days, how often were most of the students in your school kind and helpful?”. Response options to the question were from 1=never to 5=always [recoded 1=sometimes to always (yes); 0=never or rarely (no)]. Parental/guardian supervision, connectedness and bonding were assessed by the following questions, respectively: (i) “During the past 30 days, how often did your parents or guardians check to see if your homework was done?”, (ii) “During the past 30 days, how often did your parents or guardians understand your problems and worries?”, and (iii) “During the past 30 days, how often did your parents or guardians really know what you were doing with your free time?”. Response options to these questions were from 1=never to 5=always [recoded 1=most of the time or always (yes); 0=never to sometimes (no)].

Regarding health risk behavioral factors, current smoking was assessed by the question: “During the past 30 days, on how many days did you smoke cigarettes?”. Response options to the question were from 1=0 days to 7=all 30 days [recoded 1=one or more days (yes); 0=0 days (no)]. Current drinker was assessed by the question:

“During the past 30 days, on how many days did you have at least one drink containing alcohol”. Response options to the question ranged from 1=0 days to 7=all 30 days [recoded 1=one or more days (yes); 0=0 days (no)]. Illicit drug use and sexual intercourse were assessed by the following two questions: (i) “Have you ever used drugs?” and (ii) “Have you ever had sexual intercourse?”, respectively. The answer to these two questions was binary (yes=1; no=0). Physical fighting was assessed by the question: “During the past 12 months, how many times were you involved in a physical fight?”. Response options to the question were from 1=0 times to 8=12 or more times [recoded 1=one or more times (yes); 0=0 times (no)]. Drunk driving was assessed by the question: “During the past 30 days, how many times did you drive a car or other vehicle when you had been drinking alcohol?”. Response options to the question were from 1=0 times to 5=6 or more times [recoded 1=one or more times (yes); 0=0 times (no)].

## Data analysis

Data analysis was performed using SPSS for Windows (version 22.0) statistical software package (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to describe the prevalence of suicidal ideation by demographic, psychosocial, social-environmental and health risk behavioral factors. Chi-square tests identified bivariate associations between the independent variables and suicidal ideation. The correlation between these variables and suicidal ideation was analyzed with univariable and multivariable logistic regression analyses. Variables that are statistically significant at  $p < 0.05$  in univariate analysis were included in the multivariate analysis model. Odds ratios (ORs) and their 95% confidence intervals (CIs) were presented to show the association.

## Results

Table 1 shows the prevalence of suicidal ideation by demographic, psychosocial, social-environmental and health risk behavioral factors among Malaysian adolescents aged 16–17 years. The detailed breakdown of the percentages for each variable is shown in Table 1. Overall, 6.2% of the sample had seriously considered attempting suicide during the past 12 months. Female adolescents reported a significantly higher prevalence of suicidal ideation than male adolescents (7.6% vs. 4.7%,  $p = 0.002$ ). Chi-square analysis reveals statistically significant associations between gender, ethnicity and perceived academic performance with suicidal ideation. There are also strong associations between psychosocial (loneliness, anxiety or worry), social-environmental (have close friends, supportive peers, parental supervision, connectedness and bonding) and health risk behavioral factors (current drinker, ever used illicit drugs, ever had sexual intercourse, physical fighting, driving a vehicle after drinking alcohol) with suicidal ideation. Parent’s marital status,

**Table 1:** Prevalence of suicidal ideation by demographic, psychosocial, social-environmental and health risk behavioural factors among Malaysian adolescents aged 16–17 years.

Variables	Total n (%)	Suicidal ideation prevalence (%)	Chi-square (p-Value)
Overall	2789 (100)	6.2	
Demographics			
Gender			
Male	1340 (48.0)	4.7	0.002
Female	1449 (52.0)	7.6	
Ethnicity			
Malay	2184 (78.6)	5.4	0.001
Chinese	397 (14.3)	8.8	
Indian	197 (7.1)	10.7	
Parent's marital status <sup>a</sup>			
Married	2582 (93.3)	6.1	0.261
Divorced/widowed	184 (6.7)	8.2	
Household size <sup>a</sup>			
<5	598 (21.5)	5.2	0.267
5–7	1717 (61.6)	6.8	
≥8	472 (16.9)	5.3	
Self-rated academic performance <sup>a</sup>			
Excellent/good	1709 (61.6)	5.8	<0.001
Fair	962 (34.7)	6.0	
Poor/very poor	103 (3.7)	15.5	
Psychosocial factors			
Loneliness <sup>a</sup>			
Yes	175 (6.3)	24.6	<0.001
No	2610 (93.7)	4.9	
Anxiety or worry <sup>a</sup>			
Yes	187 (6.7)	23.5	<0.001
No	2598 (93.3)	5.0	
Social-environmental factors			
Have close friends <sup>a</sup>			
Yes	2671 (96.1)	5.8	<0.001
No	108 (3.9)	16.7	
Supportive peers <sup>a</sup>			
Yes	2197 (79.2)	5.1	<0.001
No	577 (20.8)	10.4	
Parental supervision <sup>a</sup>			
Yes	1137 (40.9)	3.9	<0.001
No	1643 (59.1)	7.9	
Parental connectedness <sup>a</sup>			
Yes	1799 (64.7)	4.6	<0.001
No	983 (35.3)	9.2	
Parental bonding <sup>a</sup>			
Yes	2108 (75.9)	5.0	<0.001
No	670 (24.1)	10.1	
Health risk behaviours			
Current smoker <sup>a</sup>			
Yes	405 (14.6)	6.7	0.668
No	2373 (85.4)	6.1	
Current drinker <sup>a</sup>			
Yes	138 (5.0)	13.0	0.001
No	2630 (95.0)	5.8	
Ever used illicit drugs <sup>a</sup>			
Yes	97 (3.5)	15.5	<0.001
No	2686 (96.5)	5.9	
Ever had sexual intercourse <sup>a</sup>			
Yes	122 (4.4)	23.8	<0.001
No	2663 (95.6)	5.4	

Table 1 (continued)

Variables	Total n (%)	Suicidal ideation prevalence (%)	Chi-square (p-Value)
Physical fight <sup>a</sup>			
Yes	397 (14.3)	13.6	<0.001
No	2378 (85.7)	4.9	
Driving a vehicle after drinking alcohol <sup>a</sup>			
Yes	68 (2.5)	14.7	0.003
No	2688 (97.5)	6.0	

<sup>a</sup>The total number of responses differs due to missing data for each variable.

household size and current smokers show no significant association with suicidal ideation.

Table 2 shows the univariate and multivariate logistic regression analyses of factors associated with suicidal ideation among Malaysian adolescents aged 16–17 years. In univariate analysis, demographic variables, such as gender, ethnicity and self-rated academic performance, are found to be significantly associated with suicidal ideation. Loneliness, anxiety or worry, no close friends, no supportive peers, lack of parental supervision, connectedness or bonding are positively associated with suicidal ideation. Health risk behaviors, such as being a drinker, ever having used illicit drugs, ever having had sexual intercourse, physically fighting and driving a vehicle after drinking alcohol, are found to be risk factors associated with suicidal ideation. Most of the variables that are found to be significant in the univariate analysis remained significant in the multivariate logistic regression model. Multivariate logistic regression analysis shows that adolescents who are females, Indians, have feelings of loneliness, anxiety or worry, no close friends, no supportive peers, ever had sexual intercourse and involved in physical fight are more likely to have suicidal ideation.

## Discussion

This study found an overall prevalence of suicidal ideation of 6.2% among school-going adolescents aged 16–17 years in Peninsular Malaysia. The prevalence is lower than the national prevalence of suicidal ideation (7.9%) reported in the Malaysia GSHS (11). The results should be interpreted with caution as our findings only focus on Peninsular Malaysia and not the whole Malaysia. Our prevalence is also lower compared to that of Thailand (8.8%) (18), Philippines (16.3%) (19) and Vietnam (16.9%) (20). Though the prevalence of suicidal ideation varies across different study populations and age groups, our study indicated significantly higher prevalence of suicidal

ideation among female adolescents (7.6%) compared to male adolescents (4.7%), which is consistent with findings reported in many other previous studies (11, 12, 14, 21). Studies in China also found that suicidal ideation was more common among female adolescents (22, 23). Several factors may account for this observation including a higher tendency of depression among females than males (24). Females may be more likely to consider suicide under some stressful conditions. While the gender disparity in suicidal ideation in many settings is that females are more likely to have suicidal ideation, the gender disparity is reversed with regards to suicide commission. Globally, the actual suicide rates are higher among males than females (25).

The prevalence of adolescent suicidal ideation has also been shown to vary by ethnicity. The Indian ethnic group is more likely to have suicidal ideation compared to Malays. The higher rate of suicidal ideation among Indian adolescents has been consistently reported in other studies in Malaysia (11, 26, 27). Malay adolescents reported the lowest prevalence of suicidal ideation among the three major ethnic groups in Malaysia probably because most Malay adolescents are Muslim. The religion Islam strictly prohibits suicide. Religion has long been regarded as an important factor in suicidal behavior. The variation according to ethnicity may also be due to other cultural factors, such as the availability of a lethal suicide method and cultural norms against suicide (28).

In this study, there is no significant association between self-rated academic performance and suicidal ideation in the adjusted model. Our finding is in contrast with other studies which reported that poor academic performance is related to suicidal behavior in adolescents (29, 30). Self-rated academic performance is defined as how students perceived their own overall academic performance (31). Students' self-rated academic performance may be different from their actual academic performance. Perception of academic performance is influenced by personality factors, cognitive factors such as a lack of

**Table 2:** Univariate and multivariate logistic regression analyses of factors associated with suicidal ideation among Malaysian adolescents aged 16–17 years.

Variables	Crude OR (95% CI)	Adjusted OR <sup>a</sup> (95% CI)
<b>Demographics</b>		
<b>Gender</b>		
Male	1.00	1.00
Female	1.67 (1.21–2.29) <sup>b</sup>	2.02 (1.40–2.92) <sup>c</sup>
<b>Ethnicity</b>		
Malay	1.00	1.00
Chinese	1.71 (1.15–2.53) <sup>b</sup>	1.43 (0.88–2.34)
Indian	2.11 (1.29–3.44) <sup>b</sup>	2.32 (1.35–3.98) <sup>b</sup>
<b>Parent's marital status</b>		
Married	1.00	–
Divorced/widowed	1.37 (0.79–2.38)	
<b>Household size</b>		
<5	1.00	–
5–7	1.33 (0.89–1.99)	
≥8	1.02 (0.60–1.76)	
<b>Self-rated academic performance</b>		
Excellent/good	1.00	1.00
Fair	1.04 (0.75–1.46)	0.87 (0.60–1.28)
Poor/very poor	2.99 (1.69–5.29) <sup>c</sup>	1.77 (0.88–3.57)
<b>Psychosocial factors</b>		
<b>Loneliness</b>		
Yes	6.27 (4.26–9.23) <sup>c</sup>	2.54 (1.57–4.11) <sup>c</sup>
No	1.00	1.00
<b>Anxiety or worry</b>		
Yes	5.89 (4.02–8.62) <sup>c</sup>	2.70 (1.70–4.31) <sup>c</sup>
No	1.00	1.00
<b>Social-environmental factors</b>		
<b>Have close friends</b>		
Yes	1.00	1.00
No	3.27 (1.92–5.56) <sup>c</sup>	2.71 (1.43–5.14) <sup>b</sup>
<b>Supportive peers</b>		
Yes	1.00	1.00
No	2.18 (1.57–3.03) <sup>c</sup>	1.69 (1.15–2.47) <sup>b</sup>
<b>Parental supervision</b>		
Yes	1.00	1.00
No	2.12 (1.49–3.01) <sup>c</sup>	1.40 (0.93–2.09)
<b>Parental connectedness</b>		
Yes	1.00	1.00
No	2.08 (1.53–2.84) <sup>c</sup>	1.35 (0.92–1.98)
<b>Parental bonding</b>		
Yes	1.00	1.00
No	2.16 (1.57–2.96) <sup>c</sup>	1.04 (0.70–1.55)
<b>Health risk behaviours</b>		
<b>Current smoker</b>		
Yes	1.10 (0.72–1.68)	–
No	1.00	
<b>Current drinker</b>		
Yes	2.45 (1.45–4.12) <sup>b</sup>	1.28 (0.65–2.53)
No	1.00	1.00
<b>Ever used illicit drugs</b>		
Yes	2.93 (1.65–5.19) <sup>c</sup>	1.34 (0.66–2.71)
No	1.00	1.00
<b>Ever had sexual intercourse</b>		
Yes	5.46 (3.48–8.55) <sup>c</sup>	2.70 (1.48–4.92) <sup>b</sup>
No	1.00	1.00

Table 2 (continued)

Variables	Crude OR (95% CI)	Adjusted OR <sup>a</sup> (95% CI)
Physical fight		
Yes	3.07 (2.18–4.32) <sup>c</sup>	2.45 (1.62–3.70) <sup>c</sup>
No	1.00	1.00
Driving a vehicle after drinking alcohol		
Yes	2.71 (1.36–5.39) <sup>b</sup>	0.85 (0.33–2.20)
No	1.00	1.00

<sup>a</sup>Odds ratios adjusted for all other variables shown in the table. OR, Odds ratio; CI, confidence interval. Significance: <sup>b</sup> $p < 0.01$ ; <sup>c</sup> $p < 0.001$ .

optimism, learning ability, and recent experiences of examination results (29). Therefore, perceived academic performance being a complex interacting variable may explain the non-significant finding in our study.

Psychosocial distress such as loneliness, anxiety or worry, hopelessness and sadness may increase to unbearable levels leading to suicidal ideation, attempts, or actual suicide (32). Our study showed that adolescents who reported loneliness, anxiety or worry were at greater risk for suicidal ideation. This finding is in agreement with other studies concerning the positive association between loneliness, anxiety or worry and suicidal ideation (11, 12, 33). Adolescents who have no close friends or no supportive peers were also found to be more likely to report suicidal ideation. Having close friends and supportive peers served as protective factors against suicidal ideation as reported in previous studies (11, 12). However, our study did not find any significant association between parental supervision, parental connectedness and parental bonding with adolescent's suicidal ideation in the multivariate analysis model. These findings are similar to findings from the national GSHS (11), but many other studies reported a significant protective effect of a positive family environment against suicidal ideation (12, 13, 18).

Involvement in risky behaviors such as sexual activity and physical fighting has been reported to be independently associated with increased risk of suicidal ideation and attempts among adolescents (34). Consistent with previous studies, our study finds that having had sexual intercourse is associated with suicidal ideation (12, 18, 35). Premarital sexual intercourse might be voluntary or forced. In addition, unprotected sexual activity can contribute to stressful life events such as unintended pregnancy, unwanted childbearing and abortion, as well as HIV and other sexually transmitted infections (36). Stressful life events are often followed by impulsive suicidal behaviors (37). Our findings also support the association between involvement in physical fight and suicidal ideation among

adolescents. Disruptive behaviors such as physical fighting are early markers for emotional problems manifested by feeling sad or hopeless or suicidal ideation (38).

However, other health risk behaviors (smoking, alcohol drinking, illicit drug use) and driving a vehicle after drinking alcohol are not associated with suicidal ideation in this study, unlike in some other studies (23, 28, 39). The different measures and the time frame during which health risk behaviors and suicidal ideation were assessed may account for the different findings. Suicidal behavior has a large number of underlying causes. The factors that place individuals at risk for suicide are complex and interactive. Suicidal ideation and attempts are notoriously difficult to predict and prevent due to the concealment of suicidal thoughts, as well as the transient nature of such thoughts (40). For instance, suicidal thoughts typically are transient in nature and may be absent during survey time but then reappear shortly thereafter.

The findings in this study are of public health significance. It is important for school counsellors and other mental health professionals to screen mental health problems and suicidal ideation among students who are at risk of suicide and refer them to mental health service providers. Government health policy makers should work together with schools in formulating appropriate and effective psychological prevention and intervention programs for school adolescents. In addition, health programs from non-governmental organization (NGO) such as the Befrienders hotline, which aims to benefit society by improving people's emotional health, should also be promoted to reach out to the community particularly to groups at high risk for suicide. Both government and NGOs need to work together in order to provide on-site emotional support, talks, workshop sessions and seminars on counselling skills, suicide prevention and mental health awareness programs toward the building of positive mental health among adolescents.

Several limitations of our study should be noted. First, the cross-sectional nature of the study prevents

us from establishing the causal relationships among the studied variables. A longitudinal research could explore the causal relationship. Second, data in the current analysis were based solely on adolescent self-reports and were not verified by using a secondary source. However, participants in this study were assured that their responses would remain anonymous and confidential. This assurance may have helped the collection of accurate information and encouraged the accurate reporting of suicidal ideation and attempts. Third, our study may not be representative of all adolescents in Malaysia because we only recruited participants from school-going adolescents in Peninsular Malaysia. Despite the above-mentioned limitations, our findings provide important evidence on risk factors associated with suicidal ideation among Malaysian adolescents, and also highlight the importance of targeting adolescents with psychosocial problems and engaged in risky behaviors for intervention programs.

## Conclusion

Early identification of adolescent students at risk of suicide is of great importance for the prevention of youth suicide. Our study found that being female, a member of an ethnic group, loneliness, anxiety or worry, having no close friends, lack of supportive peers, having had sexual intercourse and involvement in physical fights were risk factors for suicidal ideation among adolescents. The present findings have provided greater insight into modifiable risk factors for suicidal behavior among adolescents and therefore have important implications for the development of targeted adolescent health programmes in school and in the community. Cooperation among family, school, psychological professionals and health policy makers may help in the early identification of adolescents at risk of suicidal ideation and reduce adolescents' attempted suicide rate. Although this study aimed to identify specific risk factors for suicidal ideation, there are other potential factors which were beyond the focus of this study. Further studies are required to investigate other aspects, such as self-esteem, sleep disturbance, religious beliefs and practices that could be related to adolescents' suicidal behavior.

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